

SUPPLY DEVICE OF MEDICINE USED IN AUTOMATIC COUNTING AND PACKING SYSTEM AND SUPPLY METHOD OF MEDICINE

BACKGROUND OF THE INVENTION

The present invention relates to a supply device of medicine used in an automatic counting and packing system, which is designed to distribute a variety of tablets, supplied from tablet cassettes and supply them to a packing means dose by dose, and to a supply method of medicine. More particularly, the present invention relates to a supply device of medicine used in an automatic counting and packing system and a supply method of medicine, which allows a variety of tablets, supplied from a plurality of tablet cassettes, to be supplied to a packing means at a time, thereby facilitating supply of distributed tablets.

In general, there are various kinds of medicines. Such medicines should be compounded for preparation per dose. There is also an automatic counting and packing system designed for distributing and packing medicines dose by dose.

The automatic counting and packing system is a machine for dispensing and packing tablets dose by dose by means of a packing means. The packing means feeds tablets, prepared dose by dose, to a packing sheet through a hopper immediately before the packing sheet, which is folded continuously, comes into between a pair of heater knife members, and seals up the packing sheet with heat of the heater knife members by putting the packing sheet into between a pair of heater knife members.

A conventional supply device of medicine, as shown in FIG. 4, is used to supply tablets to a hopper that is a structural element of a packing means, and is so structured that a plurality of tablet cassettes 101 containing different tablets are arranged close together, a hopper 102 for gathering each tablet coming from the tablet cassettes 101 to the central side of the width direction is disposed under the tablet cassettes 101, two tablet conveyors 103 for gathering a plurality of tablets guided by the hopper 102 to the central side are mounted at both sides of the lower outlet of the hopper 102, and a supply conveyor 104 for supplying tablets

gathered by the tablet conveyors 103 to a hopper that is one element of a packing means is mounted under between the tablet conveyors 103.

In the conventional supply device of medicine structured as above, tablets contained in the tablet cassettes 101 drop down to the upper surface of the tablet conveyors 103 at a time, fed to the supply conveyor 104 by the tablet conveyors 103, and finally fed to the hopper of the packing means dose by dose by the supply conveyor 104. Then, the packing means packs tablets dose by dose.

However, the conventional supply device of medicine had a disadvantage in that since tablets contained in the tablet cassettes are gathered to the central side after being dropped down to the tablet conveyors at the same time and therefore it takes a little time to feed tablets, it is difficult to pack tablets quickly.

The conventional supply device of medicine has a further disadvantage in that since much tablet powder remains clinging to the surface of the tablet conveyors after a long-time use, the tablet conveyors are unsanitary.

SUMMARY OF THE INVENTION

The present invention is contrived to overcome the conventional disadvantages described above. Therefore, it is an object of the present invention to provide a supply device of medicine used in an automatic counting and packing system and a supply method of medicine, which allows a variety of tablets supplied from a plurality of tablet cassettes to be supplied to a packing means at a time, and tablet powder to be removed, thereby facilitating supply of distributed tablets and ensuring a sanitary use for a long time.

To achieve the above-described object, a supply device of medicine used in an automatic counting and packing system according to the present invention, which is designed to supply a plurality of tablets discharged from tablet cassettes dose by dose to a hopper as an element of a packing means and to have the packing means pack the tablets dose by dose, comprises two tablet distribution conveyors, each of which is disposed on both sides in the transverse direction under tablet cassettes and has a conveyor belt which is rotated repeatedly by

power and on the outer surface of which a plurality of partition plates stand upright in a state of being spaced apart from each other as distant as the width of a tablet cassette, a tablet supply means for feeding tablets, fed by the tablet distribution conveyors dose by dose which is mounted between the tablet distribution conveyors, to a hopper of a packing means, and powder removing means for removing tablet powder which are disposed under the tablet distribution conveyors and mounted beside the tablet supply means.

A supply method of medicine according to the present invention comprises a process of distributing portions, divided by partition plates, moving toward the center from the side, a process of tablets being supplied dose by dose to each corresponding distributing portion of each tablet distribution conveyor when the distributing portions come under a plurality of tablet cassettes disposed in the direction of width, a process of a dose of tablets being supplied to a hopper of a packing means by two corresponding distributing portions, and a process of tablets being distributed in sequence to the following distributing portions.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view showing an automatic counting and packing system to which a supply device of medicine according to the present invention applies;

FIG. 2 is a cross-sectional view taken along line A-A of FIG. 1;

FIG. 3 is an enlarged, perspective view of B section of FIG. 1; and

FIG. 4 is a schematic, perspective view of a conventional supply of medicine used in an automatic counting and packing system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the accompanying drawings, the present invention will now be described.

FIG. 1 is an elevational view schematically showing an automatic counting and packing system to which a supply device of medicine according to the present

invention applies. The supply device of medicine is designed to supply a plurality of tablets, which are discharged from a plurality of tablet cassettes 1 disposed in a dense state, to a packing means dose by dose, so that tablets will be packed dose by dose by the packing means.

The supply device of medicine is so structured that two tablet distribution conveyors 2 are disposed under the tablet cassettes 1, a tablet supply means is mounted between the two tablet distribution conveyors 2, and powder removing means are disposed under the tablet distribution conveyors 2 and mounted beside the tablet supply means.

The two tablet distribution conveyors, as shown in FIGS. 1 and 2, include belts 2b which is rotated repeatedly by power of a motor 2a and on the outer surface of which a plurality of partition plates 2c stand upright in a state of being spaced apart from each other as distant as the width of a table cassette 1, and are disposed on both sides in the transverse direction under the tablet cassettes 1 so as for the belts 2b to rotate to the transverse direction.

In particular, each tablet distribution conveyor 2, as shown in FIG. 3, has pin mounting portions 2d formed on both upper sides of the belt 2b, and pins 2e mounted at the end portion of the partition plates 2c, both ends of each pin being mounted at the pin mounting portions 2d formed on the belt 2b. A plurality of elastic members 2f are installed at each pin 2 to elastically support both sides of each partition plate 2c so that each partition plate can stand upright.

The tablet supply means, mounted between the two tablet distribution conveyors 2, is designed to feeding tablets, fed by the tablet distribution conveyors dose by dose, to a packing means. The tablet supply means is so structured that a tablet supporting plate 3 for supporting tablets fed from the tablet distribution conveyors 2 is mounted apart under between the two tablet distribution conveyors 2, tablet feeding plates 4 push a plurality of tablets out of the tablet supporting plate 3 to the packing means, and a tablet supply conveyor 2 having the belt 5a spaced at a equal distance move the tablet feeding plates 4 mounted on the belt 5a.

The powder removing means are disposed under the tablet distribution conveyors 2 and are mounted over the tablet supply means, that is, a tablet supply conveyor 5 and beside the tablet feeding plates 4 in order to remove tablet powder.

The powder removing means are so constructed that alcohol spray nozzles 6 are disposed under the two tablet distribution conveyors 2, that is, apart from the lower outer surface of the belts 2b, air spray nozzles 7 are disposed under the two tablet distribution conveyors 2, that is, apart from the lower outer surface of the belts 2b, and mounted on one side of the tablet supply means, that is, the upper outer side of belts 5, and powder suction ports 8 suck tablet powder which is separated from the belts 2b of the tablet distribution conveyors 2 and the belts 5a of the tablet supply means by air pressure of the air spray nozzles 7.

It is obvious that the alcohol spray nozzles 6 and the air spray nozzles 7 are connected to a general compressor or blower, the alcohol spray nozzles 7 are connected to a unit for supplying alcohol, and the powder suction ports 8 are connected to a vacuum generator.

Of course, the tablet cassettes 1, like conventional ones, can be arranged densely in a square shape in the transverse direction. However, in this embodiment of the present invention, one set of tablet cassettes 1a, 1b, 1c, 1d, 1e, 1f and 1g and the other set of tablet cassettes 1h, 1k, 1m, 1n, 1p, 1q and 1r are disposed separately in the transverse direction.

It is obvious that the tablet cassettes can be disposed in layers in the direction of height.

The packing means, like the conventional one, is designed to feed tablets, prepared dose by dose, to a packing sheet 12 through a hopper 13 immediately before the packing sheet 12, which is folded continuously, comes into between a pair of heater knife members 11, and to seal up the packing sheet 12 with heat of the heater knife members 11.

The supply device of medicine used in an automatic counting and packing system according to the present invention constructed as above works as follows to supply tablets to the hopper 13 that is a structural element of the packing

means.

After a prescription is inputted into a computer(not illustrated), the tablet cassettes 1 are controlled by the computer. When distributing portions divided by the partition plates 2c of the tablet distribution conveyors 2 come under a plurality of the tablet cassettes 1 disposed in the direction of width, that is, the first tablet cassettes 1a and 1h, the prescribed tablets are supplied to the distributing portions.

When the distributing portions containing tablets supplied from the tablet cassettes 1a and 1h are moved and come under the next tablet cassettes 1b and 1k, different tablets are supplied to the distributing portions. When the distributing portions come under the final tablet cassettes 1g and 1r after passing through other cassettes in that manner, the final tablets prescribed are supplied to the distributing portions.

Then, a dose of tablets are contained in two corresponding distributing portions formed on two tablet distribution conveyors. The two corresponding distributing portions continue moving and put a dose of tablets down on the table supporting plate 3. The tablets put on the tablet supporting plate 3 are supplied to the hopper 13 of the packing means by the belts 5 driven by the motor 5b and the tablet feeding plates 4 which is interlocked with the belts.

Accordingly, tablets are packed dose by dose by the packing means.

Of course, according to a prescription, tablets are continuously distributed to a plurality of distribution portions that move continuously. Thus, a plurality of tablets contained in a pair of corresponding distributing portions is supplied at a time to the hopper 13 of the packing means.

After the belts 2b of the tablet of the tablet distribution conveyors 2 rotated by about half a turn, a plurality of tablets contained in a pair of corresponding portions is supplied quickly.

On the other hand, when the outer surfaces of the belts 2b of the tablet distribution conveyors 2 comes to the downside, tablet powder is easily separated from the belts 2b by the alcohol spray nozzles 6 and the air spray nozzles 7, and is

sucked into the powder suction ports 8 at the same time.

Tablet powder is also removed from the tablet supply means by the air spray nozzles 7 and the powder suction ports 8.

Another example of a supply method of medicine is explained here. Let's suppose that there are tablets a, b, c, d, and e, and that tablets a, b and c are prescribed for being taken in the morning, tablets a, b and d are prescribed for being taken in the afternoon, and tablets a, b and e are prescribed for being taken in the evening.

In that case, when in the initial state the spaces between partition plates on both upper end portions of the belts 2a of the tablet distribution conveyors 2 go under the tablet cassettes containing the tablets a, b and c, respectively, the tablets a, b and c only to be taken in the morning are dropped into the first spaces.

Then, when the next spaces go under the tablets cassettes containing the tablets a, b and d, respectively, the tablets a, b and d only to be taken in the afternoon are dropped into the spaces.

Lastly, when the third spaces go under the tablets cassettes containing the tablets a, b and e, respectively, the tablets a, b and e only to be taken in the evening are dropped into the spaces.

Of course, the tablets dropped into the spaces are packed dose by dose as described above for delivery to a patient.

The above supply method of medicine according to the present invention makes it possible to continuously pack different tablets as prescribed to be taken in the morning, afternoon and evening, respectively. It is possible to print date and time of taking medicine on the packing sheet by means of a printer.

As discussed above, the supply device of medicine used in an automatic counting and packing system is designed to supply a variety of different tablets, supplied from a plurality of tablet cassettes, to a packing means in the central position dose by dose at a time by means of a pair of distributing portions. The supply device of medicine according to the present invention is also be able to continuously supply a dose of tablets to a pair of distribution portions, so that

tablets can be supplied and packed quickly.

Further, the present invention is designed for tablet powder to be removed by spraying and sucking air, thereby ensuring a sanitary use of an automatic counting and packing system for a long time.